THE

ONTARIO WATER RESOURCES

COMMISSION

INDUSTRIAL WASTES SURVEY

of the

TOWN OF SIMCOE

1971

A Report

on

An Industrial Wastes Survey

of

THE TOWN OF SIMCOE

1971

by

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A water Pollution Control Plant of the activated sludge type was originally completed in the Town of Simcoe in 1956, and expanded with the construction of a second plant in 1963. These combined plants were designed to serve a town of 15,400 people and associated industry. At present, with a town population of 10,400 the plant is handling waste volumes and strengths near, and at times in excess of, its design capacity.

No extensive industrial waste survey has ever been conducted in Simcoe, and the present survey was undertaken to gather information concerning the nature and quantity of industrial wastes to aid the Corporation of the Town of Simcoe in the future good management of its sewerage system and water pollution control facilities.

The Town has enacted a municipal sewer-use by-law, and must assume the responsibility for its enforcement by making and enforcing recommendations to local industries.

Long term planning and consultation between the town and all of its industries, and their acceptance of the fact that as good corporate citizens they must in earnest attempt to solve their problems, will undoubtedly, solve the current operating and nuisance problems and eliminate the majority of those which may arise in the future.

SUMMARY

Considerable difficulty was encountered during the survey in determining the exact sewer locations and connection points. This was due to a lack of up-to-date sewer plans and in one case to the complete absence of plans. In many instances further complications arose when industries were uncertain of their in-plant sewer system and their connections to the

municipal sanitary and/or storm system. The lack of manholes at many connection points prevented the taking of representative final effluent samples.

To establish an accurate industrial BOD_5 loading proved impossible for the following reasons:

1) The BOD_5 loading from several of the industries is seasonal and varies throughout the year and from product to product.

2) Many industries displayed a lack of knowledge regarding in-plant sewer systems and waste stream flows.

3) It was impossible in many cases to obtain representative final effluent samples due to the lack of suitable sampling points.

The following Companies were found to be major sources of BOD_5 loading to the municipal treatment plant.

1) Canadian Canners Limited
2) J. B. Jackson Limited
3) St. Williams Preserves Limited
4) Caswell Dairy

Only Canadian Canners Limited have a special agreement with the town for the discharge of overstrength wastes.

Oil has been an intermittant problem for sometime in both the Water Pollution Control Plant and the First Avenue lift station. The Companies directly responsible for the problem in the lift station are Morse Chain Division of Borg-Warner (Canada) Ltd. and Canvil Limited, and while not documented, are likely responsible for the oil at the municipal treatment plant. Enforcement of the Town's sewer-use by-law would alleviate the oil problems.

DETAILS OF SURVEY

Conduct

The survey was a two phase operation. The first consisted of reviewing the nature of each industry and its water consumption, and then selecting the significant industries for investigation. Of thirty-one industries, fourteen were visited, and ten sampled during the second phase.

All composite and grab samples collected from waste streams were dispatched to the OWRC laboratory in Toronto for analysis. The analytical results together with the data obtained from visites to the individual industries were compiled and incorporated into individual reports for each of the fourteen industries.

Industrial Water Supply

All the industries in Simcoe obtain water from the PUC. In addition Canvil Limited and Canadian Canners Limited utilize water from private wells.

Municipal Sewerage System

Water pollution control facilities in Simcoe consist of two conventional activated sludge plants at the same location. This combined installation has a hydraulic design capacity of 2.0 mgd and a BOD_5 design capacity of 220 mg/l. The plant is currently operating very close to and often times in excess of design capacity. Therefore any expansion, residential or industrial, will aggravate this condition.

An infiltration problem exists with the sewerage system itself which contributes adversely to the hydraulic loading at the treatment plant.

The oil accumulation problem in the First Avenue lift station originates from two of the industries on Second Avenue. Morse Chain and Canvil Limited.

The town sewer-use by-law which is designed to protect the Water Pollution Control Plant and sewerage system has not been actively enforced by the Town. It most definitely should be in the future in order to alleviate many of the existing problems and prevent more from occuring.

The problems associated with industrial wastes in the municipal sewerage system and treatment plant could be eliminated if industries built facilities and treated their own wastes. However, this is in most cases technically and economically impractical and is not the preferred course of action. Bearing in mind that the ultimate goal is the proper treatment of wastes, and that for most industrial wastes this is more easily accomplished when the wastes are mixed with sanitary wastes, industries should, where practical, discharge their wastes to a sanitary sewerage system.

Municipal Sewer-Use By-Law and Other Regulations

Biological treatment systems like the one in Simcoe are fairly sensitive and easily upset by a change of environment caused by the discharge of industrial and other wastes to the sanitary sewerage system. Consequently there must be regulations to govern the disposal of wastes to sanitary sewerage systems.

Sections 47(f), 47(g) and 50(a) of the OWRC Act empower the Commission to regulate both the quantity and quality of waste discharges to municipal sewers. These discharges are, however, more practically regulated on a municipal level.

The Corporation of the Town of Simcoe By-Law No.70-24 was enacted in October 1970 to provide the municipal regulation of waste discharges. Problems in the past demonstrated the need for this by-law, and evidence

gathered during this survey shows the need for its enforcement by the Town of Simcoe.

Industrially pertinent portions of Section 9 of the municipal by-law limit discharges to sanitary and combined sewers to the following values:

BOD_5	-	300 mg/l
Suspended solids	-	350 mg/l
Oil and grease - vegetable	-	100 mg/l
- mineral	-	10 mg/l
pH	-	5.5 to 9.5
Phenols	-	1 mg/l
Cyanides	-	2 mg/l
Heavy metals (Cu, Cr, Ni, Pb, Zn)	-	3 mg/l of each
Cadmium	-	2 mg/l

(A complete copy of the by-law is obtainable from the Simcoe PUC)

The reason for limiting the BOD_5 and solids content of wastes is to prevent the treatment plant from becoming overloaded and consequently producing a poor effluent. However, since many industrial wastes containing high concentrations of BOD and suspended solids can be treated at municipal treatment plants, and this is preferred over individual treatment systems at each industry, Section 10 of the by-law provides for special agreements to accept for treatment, wastes of excessive strength, in contravention of Section 9, by the municipality. Under these agreements the municipality may impose a surcharge to cover the cost of this added service to the industries. The existing by-law does not include a method for calculating such a surcharge but this could be developed by the municipality to arrive at a fair charge, and thus avoid lengthy and complicated negotiations with individual industries.

Any special agreement between the Town of Simcoe and any industry regarding the acceptance for treatment of over strength wastes should be approved by the OWRC, and depending on the method of financing the Water Pollution Control Plant expansion, this action may be mandatory.

The reason for limiting waste components such as phenol, cyanide, and heavy metals, is that these can be toxic to the sewage treatment process, or may not be removed in the sewage treatment plant and thus remain in the effluent presenting adverse conditions in the receiving water.

Cyanides, sulphides and inflammable material must be limited for safety reasons, and grease and oil must be controlled to prevent nuisance and operating problems.

DISCUSSION

It is necessary when establishing waste loadings to know both the flow and concentration of the wastes. In many instances during this survey this information was not available or could not be obtained.

Waste flow to the sanitary sewer is usually assumed to be the same as water consumption unless there is significant discharge of wastewater elsewhere. In the case of both Caswell Dairy and J. B. Jackson Ltd. a significant portion of the water used is for cooling and is discharged to a watercourse or storm sewer. Since this cooling water is not metered and no estimates of the volumes used were available it was not possible to determine the flow to the sanitary sewer and consequently no accurate figures for the waste loadings could be calculated.

It proved to be impossible to locate the sewer connections for Canvil and Morse Chain since the Town had no plans for this section of Second Avenue. The Companies themselves had no plans showing sewer connections, and

the absence of manholes at connection points made it impossible to obtain a sample of the final plant effluent or see where the connection was located. In order to actively and fairly enforce the sewer-use by-law it will be necessary to install manholes or suitable representative sampling and flow measurement points on total waste streams.

Due to the problems encountered in attempting to arrive at waste loading figures and the seasonal fluctuations in the waste strengths, it is not possible to calculate accurately what percentage of the total waste loading at the WPCP comes from any single industry. However, of the four major waste producing industries Canadian Canners Ltd. and J. B. Jackson Ltd. most certainly account for over 50% of the BOD loading at the treatment plant. The wastes from Caswell Dairy and St. Williams Preserves Ltd. account for a much smaller portion of the total loading likely between 5 and 10%.

The oil in the First Avenue lift station from Canvil and/or Morse Chain is mostly a nuisance problem however much of the oil carried into the lift station reaches the treatment plant where it causes operating problems.

There are smaller industries in the Town which are not significant sources of waste but which may through spills or dumps cause periodic problems for the sewage treatment plant. Such industries are dry cleaners, gas stations, machine shops and restaurants. These should not be overlooked by the Town when enforcing the sewer-use by-law.

CONCLUSIONS

1) The Town of Simcoe sewer-use by-law has not been actively enforced.

2) The following industries are significant sources of BOD loading:

Canadian Canners Limited
J. B. Jackson Limited
St. Williams Preserves Limited
Caswell Dairy

3) Oil from Morse Chain and Canvil Ltd. is a problem in the First Avenue lift station and at the sewage treatment plant.

4) Both the Town and most of the industries lacked accurate information regarding sewer locations, connections, and waste stream flows.

5) Industries in general lack suitable total plant effluent monitoring locations.

6) There are some roof drains and cooling water discharges to the sanitary sewer.

RECOMMENDATIONS

1) The Town of Simcoe sewer-use by-law must be enforced by the Town. To achieve this the town should designate an individual whose prime responsibility is the enforcement of the by-law. It will also be necessary to consider special agreements with industries concerning over strength wastes, and this could involve the development of a surcharge formula.

2) Both the Town and the industries should begin immediately to obtain more information regarding sewer locations connections and flows.

3) Manholes for sampling and flow measurement should be constructed on all connections discharging industrial wastewaters to the sanitary sewerage system.

4) Roof drainage and uncontaminated cooling water should be segregated from waste streams and discharged to the storm sewerage system.

The following are individual reports on the industries investigated during this survey. Where recommendations and comments are made concerning the discharge to sanitary sewers, these are for the guidance of the Town of Simcoe and the individual industries. The enforcement of these or alternate methods of obtaining compliance with the by-law is the responsibility of the municipality.

AMERICAN CAN COMPANY OF CANADA

Located on Robinson Street, the Company produces rigid packages (metal and wound paper cans) of paper and metal.

DETAILS OF SURVEY

The plant was visited May 5, 1971 by P. A. Fischer.

Personnel Interviewed

Mr. J. H. Wolsey - Manager

Description of Plant and Process

Tin plated sheet steel, some of it lighographed, is received at the plant and is cut, bent and soldered to form rigid packages of various shapes and sizes. An air drying laquer is sprayed on the inside of the can.

Rigid paper packages (oil and frozen juice cans) are also produced here. Different layers of paper are wound and glued together continuously to form long tubes which are then cut into can lengths.

With both paper and metal cans one end is added to the can at the factory with the other being added when the can is filled and sealed.

Specialty cans with pouring spouts and screw tops are manufactured in essentially the same way as the other cans, but with the addition of a special top.

Operating Data

Number of employees - 500 (up to 575 in summer)
Operating schedule - 24 hr/day
7 days/week

Water Supply

Source - Simcoe PUC

Volume - 34,700 gpd (average Sept. 70 to Jan.71)

Estimated Distribution

Sanitary and Domestic	-	10,500 gpd
Boiler	-	1,700 gpd
Compressor cooling water	-	22,500 gpd
		34,700 gpd

Sources of Liquid Wastes and Disposal

All wastes flow to the town sanitary system. There is a small volume of wastewater usually under 200 gpd from the "Somat" system which collects paper fibre from the paper can making operation. The water in this system is used to transport the fibre as a slurry and is recycled, the dewatered fibre sludge is trucked to the town dump.

DISCUSSION

According to the Company as of July 1, 1971, the compressors should be included in a recirculating, no overflow, cooling system which currently cools portions of the can side sealing units.

When this is accomplished water consumption and subsequent waste discharge should drop substantially.

CONCLUSIONS

The wastewaters from this plant are acceptable for treatment at the Simcoe WPCP and are within the sewer-use by-law limits.

CANWIRCO INDUSTRIES LIMITED

This Company is located on Gilbertson Drive and produces magnet wire.

DETAILS OF SURVEY

The plant was visited April 30, by Messrs. P. Chisholm and P. A. Fischer and sampled May 6 by Mr. P. A. Fischer.

Personnel Interviewed

Mr. P. J. LeGros	-	Manager
Mr. D. Wm. Nuir	-	Supervisor, Manufacturing Engineering

Description of Plant and Process

The plant receives aluminum and copper wire which is cleaned and drawn to size. Aluminum wire is cleaned in a closed system trichlorethylene bath; copper wire is cleaned by shaving off the surface. After drawing, the wire is annealed and then coated with one of a variety of enamels depending on its eventual use. The wire is baked to harden the enamel, rewound and then wrapped with paper, glass, or cotton prior to shipping.

Operating Data

Number of employees	-	250
Operating schedule	-	24 hr/day 7 days/week

Water Supply

Source	-	Simcoe PUC
Volume	-	29,600 gpd (average Sept.70 to Jan.71)

Estimated Distribution

Cooling water overflow	-	20,000 gpd
Sanitary waste	-	5,000 gpd
Unaccounted for	-	4,600 gpd
		29,600 gpd

Sources of Liquid Waste and Disposal

Cooling water is partially recirculated with the overflow from the cooling towers going to the roof drains, the flow from which is discharged via a storm sewer leading to an open watercourse behind the plant eventually reaching the Lynn River.

Sanitary wastes are discharged to the town sanitary sewer on Gilbertson Drive.

The plant is also connected to the town storm sewer on Gilbertson Drive and there is a low but continuous discharge, the exact source of which it was not possible to determine.

Sampling and Analysis

The following samples were taken on May 6, 1971 and forwarded to the OWRC laboratory for analysis:

1. Storm discharge at west end of plant top of railway embankment - Grab: 1510 hr.
2. Sanitary sewer outside plant opposite "employees entrance" Grab: 1600 hr.
3. Storm sewer discharge taken at road manhole level with fire sprinkler hydrant - Grab: 1630 hr.

The analytical results appear below:

Sample No.	BOD_5	Solids			Phenols in PPB	pH at lab.
		Total	Susp.	Diss.		
1	0.6	-	-	-	2	8.0
2	34.	600	30	520	8	8.5
3	0.4	440	5	435	0	8.6

CONCLUSIONS AND RECOMMENDATIONS

The analytical results indicate that this company's wastes are acceptable for treatment at the municipal WPCP, and being within the limits set by the municipal sewer-use by-law no problems should result in their treatment.

Discharges to storm sewers were of satisfactory quality for their continued discharge.

CANADIAN CANNERS LIMITED

The Simcoe plant of this Company is located at Robinson and Head Streets and produces soups and canned vegetables.

DETAILS OF SURVEY

The plant was visited April 30, 1971 by Messrs. P. Chisholm and P. Fischer and sampled by Mr. D. Ireland on May 11, 1971.

Personnel Interviewed

Mr. J. S. Green	-	Manager
Mr. T. Stevens	-	Canadian Canners Scientific Research Centre

Description of Plant and Process

The plant uses standard canning procedures to produce canned vegetables, soups, beans in tomato sauce, and tomatoes. Soups and beans in tomato sauce are canned throughout the year, vegetable soup and mixed vegetables are canned from September until early December and tomatoes are canned in August and September.

Operating Data

Number of employees	-	190
Operating schedule	-	8 hr/day
		5 days/week

The number of employees and hours of operation increase during tomato canning season according to the amount of tomatoes to be processed.

Water Supply

Source - The Company obtains its water from the Simcoe PUC at two metered points, one on Robinson Street and one on Yonge Street and from a Company well metered and read by the Town.

Volume	Daily Average Jan.-April 71 (Beans and Soup)	Daily Average Oct.-Dec. 70 (Veg. and Veg. Soup)	Daily Average Sept. 70 (Tomatoes)	Daily Average Sept. 70-May 71
PUC	171,500*	255,500	94,000	216,000
WELL	122,500	213,500	492,000	151,000
TOTAL	294,000	469,000	586,000	367,000

Volume	Minimum Daily Average March 71	Maximum Daily Average Nov. 70	Volume on day of sampling May 11, 1971 0900 hr. to 1700 hr.
PUC	98,000	280,000	99,900
WELL	39,800	230,500	61,600
TOTAL	137,800	510,500	161,500

*All figures in gallons

Sources of Liquid Wastes and Disposal

All plant wastes are discharged to the municipal sanitary sewer on Head Street. By far the largest part of the wastewater flow during most of the year comes from the washing of floors and machines and cooling water overflow. Bean soak water is also discharged, the volume depending on the amount of beans being canned.

Sampling and Analysis

The following samples were taken on May 11 and forwarded to the OWRC laboratory for analyses:

Sample No.	BOD_5	Solids			Anionic Detergents
		Total	Susp.	Diss.	
1	480.	680	170	510	**
2	700.	840	210	630	**
3	650.	700	130	570	0.1
4	600.	840	100	740	0.3
5	700.	820	120	700	0.1
6	600.	830	140	690	0.4
7	800.	900	100	800	0.1

** Interference

1. Total plant effluent from sump after screening composite (1/2 hr.) - 0930 to 1700 hr. - chlorine present
2. Total plant effluent from sump before screening composite (1/2 hr.) - 0930 hr.
3. Total plant effluent from sump after screening Grab: 1035 hr. - chlorine present
4. Total plant effluent from sump before screening Grab: 1040 hr.
5. Total plant effluent from sump after screening Grab: 1435 hr. - chlorine present
6. Total plant effluent from sump before screening Grab: 1430 hr.
7. Plant discharge at manhole in road outside plant Grab: 1435 hr. - chlorine present

The BOD5 concentration in the composite sample (No.1) of 480 mg/l is for some reason low and since all the grab samples taken had a

BOD_5 of between 600 and 800 mg/l the more realistic figure of 600 mg/l was used in calculating the waste loading. Sampling results from another reliable source also indicate that a BOD_5 concentration of 600 mg/l is more realistic.

WASTE LOADINGS

Flow	BOD_5 mg/l	BOD_5 lb/day	Susp. Solids mg/l	Susp. Solids lb/day
Jan.-April 71 294,000 gpd	600	1,760	170	500
May 11/71 0900 to 1700 hr. 161,500	600	970	170	274

DISCUSSION OF FINDINGS

On the day of the sampling the BOD_5 load was 970 lbs. which is significantly lower than the 1,760 lbs/day calculated using the average daily flow figures. The loading could be as high as 2,290 lbs/day BOD_5 depending on the flow and concentration of the wastes on any one day. In addition the loading during tomato processing will be substantially higher. Based on the PUC average daily flow and a BOD_5 concentration between 600 mg/l and 800 mg/l the expected daily loading during beans and soup processing, will be between 1,760 lbs. and 2,350 lbs.

Company officials indicated that a discrepancy exists between the volume of water metered into the plant by the Town and the volume of wastewater measured leaving the plant by the Company.

With the aid of the Simcoe PUC Water Works Superintendent a search was undertaken to determine if there was any other discharge of wastewaters

other than the one to the Head Street sanitary sewer. The existing street and sewer plans were examined, and all manholes and sewers around the plant were checked for flows. The only flow in any sewer was that on Head Street which was known to come from the plant. The Head Street sewer up stream of the plant discharge was dry and unused.

The only explanation for the grab samples after screening being stronger than those taken before, is that both were taken at the same time and therefore do not account for the time required to pump wastes up and through the screens. Consequently fluctuations in the strength of the wastes during this time upset the expected results.

A comparison of samples 1 and 2 showed that the screens reduced both the BOD and suspended solids of the wastes by 20 per cent.

CONCLUSIONS

Only one waste discharge point, that to the Head Street sanitary sewer, was found and therefore, unless evidence to the contrary can be found, it is to be concluded that all water used, other than that lost as steam and in products, is discharged to the sanitary sewer at that point.

From the tabulated results the waste loading during beans and soup production most likely lies between 1,760 lbs/day and 2,350 lbs/day. The BOD concentration of the waste is in excess of the sewer-use by-law limits and appears to vary throughout the day. In addition the waste flows and loadings will vary from product to product.

Uncontaminated roof drainage and some uncontaminated cooling water is discharged to the sanitary sewer.

The plant will be sampled during the tomato processing season in

order to determine the maximum waste loadings expected at that time.

RECOMMENDATIONS

The Company should continue its sampling programme in order to collect comprehensive information on waste loadings. Work should also be done to get a water balance of plant inflow and outflow.

The possibility of segregating roof drains and uncontaminated cooling water from the waste stream should seriously be investigated.

The plant waste stream should be sampled during tomato processing to establish maximum waste loadings.

CANVIL LIMITED

Canvil Limited is located at 390 Second Avenue and manufactures Steel pipe fittings.

DETAILS OF SURVEY

The plant was visited by Mr. P. A. Fischer on May 4, 1971 and sampled by him on May 10 and by Mr. D. Ireland on May 13.

Personnel Interviewed

Mr. K. Shewell - General Manager
Mr. J. Shapley - Plant Manager
Mr. H. Harris - Plant Superintendent

Description of Plant and Process

The plant is essentially a machine shop operation. Steel, received in pipe, bar, or forged form is appropriately cut and machined. Finishing consisted of cleaning and if required galvanizing either completely or in part.

The new cleaning line which handles most of the work consists of the following:

1) Alkali cleaning tank - essentially a sodium hydroxide cleaning solution.
2) Running rinse tank
3) A non caustic wash tank for articles to be galvanized
4) A phosphoric acid base solution tank
5) A hot water running rinse tank
6) A dye tank (at the time of the survey, company personnel indicated this was not used at present)

7) Rust resistant dip tank consisting of a water soluble oil.

Most fittings go through the cleaning line in the above numerical sequence.

Another smaller cleaning line operates in conjunction with the galvanizing line which consists of the following:

1) Low cyanide bath containing zinc cyanide, sodium cyanide and sodium hydroxide in a 3:6:20 ratio.
2) Running rinse tank, the water from which is treated in a "Perchloron" unit to convert cyanides to cyanate.
3) Still rinse tank
4) Brightening agent tank
5) Still rinse tank
6) Running rinse tank

The above line is used to galvanize completely where as a smaller "still" line with tanks less than one half the size of the main line is used to galvanize only the insides of fittings. This line is not in continuous use but usually runs during the day shift.

Following cleaning or galvanizing the fittings are boxed and then shipped.

Operating Data

Number of employees - 95
Operating schedule - 24 hr/day
1030 hr. Sunday to 1700 hr. Saturday

It should be noted that not all the machines nor the new cleaning line nor the "still" galvanizing line operate on a 24 hr. basis, but rather usually only operate one shift per day.

Water Supply

Source - Simcoe PUC and a private well.

PUC - 6,000 gpd
Well - 19,500 gpd
25,500 gpd - (average Sept. 70 to Jan. 71)

Sources of Liquid Wastes and Disposal

The main sources of process wastewater are the new cleaning line and the cleaning and galvanizing line.

The rinse waters of the new cleaning line run continuously all day although the line is only used for one shift.

The "still" galvanizing line also contributes to the waste loading when it is operating. All these wastes plus the sanitary wastes are discharged to the municipal sewer on Second Avenue.

Sampling and Analysis

The following samples were taken on May 10 and May 13 and forwarded to the OWRC laboratory for analysis:

*1. Final effluent from new cleaning line
Composite: 1615 to 2030 hr. (half hourly)

2. Final effluent from galvanizing and cleaning line
Composite 1630 to 2030 hr.

3. Final effluent from galvanizing and cleaning line
Composite 1630 to 2030 hr.)

4. "Perchloron" tank discharge
Grab: 1715 hr. (preserved with NaOH)

*Although rinse water was left running the line was not in use at this time.

5. Final effluent from new cleaning line
   Composite: 0945 to 1045 hr. (every 5 min.) - May 13, 1971.

The analytical results:

Sample No.	BOD_5	Solids			Cyanide as HCN	Zinc as Zn	Anionic Detergent as ABS	Total Phosphorus	Ether Extract
		Total	Susp.	Diss.					
1	10	400	40	360	-	0.15	0.1	28	-
2	12	480	15	430	4.4	3.6	0.1	28	-
3	-	-	-	-	111	60.5	-	-	-
4	-	-	-	-	49	51.5	-	-	-
5	34	520	180	340	-	0.45	-	44	103

DISCUSSION

It can be seen from the analytical results that there are waste streams containing zinc, cyanide and ether extractable oil well in excess of the sewer-use by-law limits. Also evident is the fact that these concentrations are much reduced when the waste streams mix. The absence of a suitable sampling point on final total effluent streams prevented the taking of representative final effluent samples.

A comparison of samples 4 and 5 show that the "Perchloron" cyanide destruction unit is operating at only 44% efficiency. This low efficiency is likely caused by a low chlorine residual in the waste stream, indicating that the unit does not receive adequate maintenance and attention, or is hydraulically overloaded.

CONCLUSIONS AND RECOMMENDATIONS

During the survey the physical proximity of the plant to Mill Pond was carefully noted as was the oily nature of the ground behind the plant

and the wastes stored there. It is requested that a concrete pad and facilities for the catching and separation of oil from ground runoff be installed. In addition no liquid or solid, fill or waste, should be discharged or dumped on the bank of Mill Pond behind the plant.

All running rinses should be turned off when a line is not in use, this will substantially reduce water consumption and the hydraulic load to the sewer.

Overflow pipes from tanks in the cleaning lines which do not have a continuous discharge (e.g. oil dip, dye tank) should be directed to a barrel mounted behind the tank rather than the waste stream trough. This will eliminate any possibility of an accidental discharge or overflow.

The Company should review the operation of the cyanide treatment unit and ensure its efficiency operation.

The only way to conclusively prove or disprove whether or not the final plant effluents meet or exceed the municipal sewer-use by-law would be to intall suitable sampling points of the final effluent streams where a representative sample could be obtained.

CASWELL DAIRY LIMITED

This dairy, part of Beatrice Foods, is situated at 469 Norfolk Street, North.

DETAILS OF SURVEY

The plant was visited April 29, 1971 by Messrs. P. Chisholm and P. A. Fischer and one sample taken the same day.

Personnel Interviewed

Mr. Good - Manager

Description of Plant and Process

This dairy uses standard milk processing procedures to produce ice cream and bottled milk in disposable containers. The dairy processes 40,000 to 50,000 lbs. of milk a day, 4,000 lbs. of which, as milk and cream, are used in making ice cream.

Operating Data

Number of employees	-	20
Operating schedule	-	0600 to 1700 hr. 6 days/week

Water Supply

Source - Simcoe PUC

Volume - 35,200 gpd - (average Sept. 70 to Jan.71)

Sources of Liquid Waste and Disposal

The main source of liquid waste is from the washing of tank trucks floors and equipment. Uncontaminated cooling water is discharged directly to the Lynn River.

Sampling and Analysis

A grab sample of the cooling water discharge to the Lynn River was taken and forwarded to the OWRC laboratory in Toronto for analysis, the results of which follow:

BOD_5	Solids			pH at Lab.
	Total	Susp.	Diss.	
4.5	360	5	355	8.5

WASTE LOADINGS

The following waste loadings are based on the maximum amount of milk handled (50,000 lb/day) and data from "An Industrial Wastes Guide to the Milk Processing Industry", a United States Public Health publication.

Process	lb. BOD_5/10,000 lbs. milk received	Actual waste loading
Receiving and cooling	4	20.0
Tank truck delivery wash-up	1	5.0
Fluid milk storage	0.5	2.5
Cream separating	2	2.0
Milk pasturizing	6	24.0
Ice cream mix making	4	1.6
Ice cream freezing	0.5	0.3
		55.4

The figure of 55.4 lb. BOD_5/day should be taken as the maximum average loading, but on any one day a spill or leak may significantly increase the loading. There is also a seasonal fluctuation, with more milk being handled in summer than in winter.

Good housekeeping in all dairies is extremely important in order to minimize spills and leaks. Raw milk has a BOD_5 of 102,000 mg/l and the

spillage of a 10 gallon can would add 10.2 lbs. to the existing BOD load.

CONCLUSIONS AND RECOMMENDATIONS

There are no batch dumpings of whey or buttermilk nor is there any appreciable amount of strong caustic bottle washing solution, therefore normal dairy operation and ice cream making wastes should pose no problem for the Water Pollution Control Plant in Simcoe. However, there is a strong possibility that the BOD concentration of the wastewater will be in excess of the municipal sewer-use by-law if a large enough portion of the total water used at the dairy is discharged as cooling water to the Lynn River.

It is recommended that the volume of the wastes being discharged to the sanitary sewer be accurately determined to resolve whether or not the wastes exceed the by-law limits.

J.B.JACKSON LIMITED

Good Humor and other novelty ice cream products are produced by this Company which is part of the Unilever organization and located at 172 Union Street.

DETAILS OF SURVEY

The plant was visited April 30, 1971 by Messrs. P. Chisholm and P. A. Fischer and sampled May 12, 1971 by Mr. D. R. Ireland.

Personnel Interviewed

Mr. K. G. Smith - Plant Manager
Mr. H. Judd

Description of Plant and Process

The plant operates in many respects like a dairy. Condensed milk and cream (the equivalent of 3×10^6 lb. of milk plus 1×10^6 lb. of 40% b.f. cream a year) are received and mixed with appropriate flavours sugar and additives depending upon the ice cream to be produced. The various types of ice cream are produced on a number of specialized machines and according to the line, nuts, coatings or other novelty additions may be added during production.

All lines enter a freezer immediately upon having been packaged and remain there until shipment.

Operating Data

Number of employees - 120
Operating schedule - 8 hrs. a day in winter
16 hrs. a day in summer
5 days/week

Water Supply

Source - Simcoe PUC

Volume - 62,000 gpd (average Sept. 70 to Jan. 71)

Sources of Liquid Wastes and Disposal

The main sources of liquid wastes are cooling waters and wash waters.

Cooling waters are partially reused, but there is a continuous overflow to the municipal storm sewer.

The actual caustic wash solution is recirculated and dumped once a week, however, the iodine containing sanitization rinse is discharged after use; both the wash solution and the rinse are discharged with the sanitary wastes to the municipal sanitary sewer on Head Street.

The main wash-up of equipment and floors occurs at the end of the day. However, a radical flavour change, e.g. from chocolate to vanilla, would require a cleaning operation during the day.

Sampling and Analysis

The following samples were taken May 12, and forwarded to the OWRC laboratory for analysis:

1. Iodine rinse solution used after caustic wash
   Grab: 0935 hr.
2. Total plant effluent to sanitary sewer - 1/2 hr.
   Composite: 0930 to 1700 hr.
3. Total plant effluent to sanitary sewer - 1/2 hr.
   Composite: 1200 hr. to 1700 hr.
4. Flow through storm sewer between buildings
   Grab: 1430 hr.
5. Total plant effluent to sanitary sewer
   Grab: 1445 hr.

The following are the analytical results:

Sample No.	BOD_5	Solids			Anionic Detergent	Iodine
		Total	Susp.	Diss.		
1	36	580	110	470	-	10
2	6000.	4,060	785	3,275	*	-
3	2800	3,360	415	2,945	*	< 1
4	18	360	10	350	0.0	7
5	460.	720	155	555	0.1	< 1

*Interference inhibits analysis

WASTE LOADINGS

It is not possible to calculate a waste loading since the volumes of uncontaminated cooling water and contaminated wastes were not known. In addition the strength and volume of the wastes varied substantially during the day.

DISCUSSION

If it is assumed that 60% of the water used is discharged as process wastewater with a BOD_5 of 3,000 mg/l the BOD_5 loading would be 1,140 lb/day. Increased production and water consumption during the summer would increase this loading substantially; in winter the reverse would likely occur.

It cannot be too forcefully emphasized how important it is to avoid spillage in this particular plant. In an ordinary dairy a 10 gal. spill of milk with a BOD_5 of 102,000 mg/l will add 10.2 lb. of additional BOD to the waste loading, cream has a BOD approximately four times that of raw milk and an equivalent 10 gal. spill would add over 40 lbs. of additional BOD. Obviously great care must be taken to minimize spillage and leakage. On no occasion should batch dumpings of any milk products be made.

CONCLUSIONS AND RECOMMENDATIONS

In spite of the problems encountered in attempting to calculate a waste loading for this industry the analytical results show that the waste discharge is in excess of the sewer-use by-law limits with respect to the BOD concentration.

Although housekeeping within the plant appeared adequate a greater effort should be made to minimize drips leaks and spills.

Since the wastes are in excess of the sewer-use by-law, and should the Town enact a sewer-use surcharge based on waste loading, it will be necessary to meter the waste flow and sample it to obtain a composite sample proportional to the flow.

Cooling wastewater was of an acceptable quality for discharge to the storm sewer.

JAX MOULD AND MACHINE LIMITED

Jax Mould and Machine located on Donly Drive produces tire moulds for the rubber industry.

DETAILS OF SURVEY

Mr. P. A. Fischer visited the plant May 4, 1971.

Personnel Interviewed

Mr. Wray S. Rogers - Comptroller

Description of Plant and Process

The plant is essentially a dry machine shop operation. The basic form of the mould is machined out with the finer details being hand worked by individual machinists.

The meeting faces of the two mould halves are hardened in a sulphuric acid bath to make them wear resistant.

As well as producing new moulds the plant also remachines old ones with new tread designs.

Operating Data

Number of employees - 111
Operating schedule - 2 - 9 hr. shifts/day
6 days/week

Water Supply

Source - Simcoe PUC
Volume - 14,700 gpd (average Sept. 70 - Jan. 71)

Sources of Liquid Waste and Disposal

The sanitary wastes from the plant alone are discharged to the municipal sanitary sewer on Donly Drive.

The other liquid wastes, cooling water from a 40 hp. compressor and the overflow from the rinse tank following the sulphuric acid bath flow to an 8" tile system running to the south behind the plant. Since the acid bath is only used one or two days a month the major source of waste to the tile system is cooling water from the compressor.

Sampling and Analysis

No sampling was done since the acid bath and rinse tank were not in use and only sanitary waste flows to the municipal sanitary sewer.

WASTE LOADING

Other than sanitary wastes, there are no discharges to the municipal sewer system.

CONCLUSIONS AND RECOMMENDATIONS

The only wastes discharged to the municipal sanitary system are sanitary wastes.

In the long term, a more positive waste control programme should be considered. The cooling water could be segregated for discharge to a storm sewer, and the intermittent acid rinse waters neutralized perhaps on a batch basis before discharge to the field tile. It is likely that the existing practices produce corrosive conditions that could adversly affect the Company's drains and field tile system.

MORSE CHAIN DIVISION OF BORG-WARNER (Canada) LTD.

The plant of this Company is located on Second Avenue and produces automotive and industrial chain.

DETAILS OF SURVEY

Mr. P. A. Fischer visited the plant on May 5, 1971 and Mr. D. Ireland sampled it on May 10, 1971.

Personnel Interviewed

Mr. M. J. Storozuk - Plant Superintendent

Description of Plant and Process

Spring steel is received at the plant and appropriately stamped or machined to produce the chain components. These parts then go through the following stepwise process:

1) Recycling caustic wash
2) Heat treatment
3) Oil quench
4) Detergent wash

The parts are then tumbled with sand and water, dried and the assembled into chains for shipment.

Operating Data

Number of employees - 85
Operating schedule - 16 hr/day
5 days/week

Water Supply

Source - Simcoe PUC
Volume - 11,600 gpd (average Sept.70 to Jan.71)

Sources of Liquid Wastes and Disposal

There are continuous overflows from the detergent washing of the chain parts and the sand water tumbling operation.

Both of these streams go to the municipal sanitary sewer, on Second Avenue. There are two sand traps on the stream from the sand and water tumblers. On the final effluent stream there is a small oil separating catch basin which acts as a third sand trap.

According to the Company personnel compressor cooling water is discharged to the municipal storm sewer on Second Avenue.

Sampling and Analysis

The following samples were taken on May 10 and forwarded to the OWRC laboratory for analysis:

1. Wash water overflow from large heat treating machine - Composite: (1/2 hr.) - 1530 to 2030 hr.
2. Rinse water overflow from large heat treating machine - Compsoite: (1/2 hr.) - 1530 to 2030 hr.
3. Rinse water overflow from small heat treating machine - Composite: (1/2 hr.) - 1530 to 2030 hr.
4. Wash water overflow from small heat treating machine - Composite: (1/2 hr.) - 1530 to 2030 hr.
5. Final water discharge from sand and water tumbler unit - Composite: (1/2 hr.) - 1530 to 2030 hr.
6. Wash water overflow from large heat treating machine - Grab: 1615 hr.
7. Rinse water overflow from large heat treating machine - Grab: 1620 hr.
8. Rinse water overflow from small heat treating machine - Grab: 1635 hr.

9. Wash water overflow from small heat treating machine - Grab: 1640 hr.

10. Final water discharge from sand and water tumbler unit - Grab: 1610 hr.

Sample No.	BOD_5	Solids			Ether Extract	Total Iron	Anionic Detergents	Total Phosphorus
		Total	Susp.	Diss.				
1	1000.	*	*	*	-	2.5	160	8.5
2	14.	360	20	340	-	1.72	0.4	.24
3	22.	440	10	430	-	0.6	0.9	.04
4	2000.	3,260	1,860	1,400	-	1.64	95.	5.0
5	100.	1,200	270	930	-	36.	8.2	2.1
6	-	-	-	-	3,400	-	-	-
7	-	-	-	-	21	-	-	-
8	-	-	-	-	20	-	-	-
9	-	-	-	-	3,224	-	-	-
10	-	-	-	-	53	-	-	-

*Does not dry

DISCUSSION OF FINDINGS

Considerable difficulty was encountered in taking a representative sample of the final plant effluent. Indeed, this proved impossible due to the absence of manholes both on the street and on the Company property. The only access to the total process waste stream was at the oil separating catch basin where the oil layer prevented the taking of an uncontaminated sample. When the sump was first seen on May 10, 1971 it appeared very shallow, almost full with sand and oil, repeated attempts with a sampling pail failed to bring up any significant quantity of water.

A check on this sump several days later showed that it had been cleaned out and was certainly much deeper. At this time there was water in

the sump. However, once again the layer of oil on top of this water prevented an uncontaminated sample being obtained with the equipment available.

CONCLUSIONS AND RECOMMENDATIONS

The condition of the sump and sand traps indicated that more frequent cleaning was required.

It was impossible to determine whether or not the strength of the total waste stream from this plant was in excess of the municipal sewer-use by-law due to the absence of an appropriate sampling point. The analytical results show that within the plant there are sources of very high strength wastes which almost certainly cause the concentration of ether solubles materials in the final effluent stream to be in excess of the by-law limits. This appears to be borne out by the accumulation of oil in the First Avenue lift station.

It is recommended that the location of all connections to the sanitary sewer be established and a suitable sampling station created to determine the nature of the total plant discharge.

NORFOLK FRUIT GROWERS ASSOCIATION

This association has two locations, one on West Street and another at 99 Queensway East.

WEST STREET PLANT

DETAILS OF SURVEY

Messrs. P. Chisholm and P. A. Fischer visited this location on April 30, 1971.

Personnel Interviewed

Mr. K. Druyff

Description of Plant and Process

This plant is an apple cold storage plant with a retail apple outlet. Apples picked in the fall are stored in large refrigerated vaults for shipping and sale during the remainder of the year.

Operating Data

Number of employees - 20
Operating schedule - 8 hr. day
(Office and sales staff) - 5 days a week

Water Supply

Source - Simcoe PUC
Volume - 12,900 gpd. maximum 26,700 gpd (Aug. 70)
(Average May'70 to May'71)

Sources of Liquid Wastes and Discharges

Sanitary wastes are discharged to the municipal sanitary sewer. The cooling water is discharged to the municipal storm sewer.

Sampling and Analysis

No samples were taken.

CONCLUSIONS

Waste disposal practices are satisfactory.

The volume of cooling water discharged to the storm sewer should be reduced in the near future since the association plans to install recirculating equipment. Care must be used in selecting any chemicals to be used in the recirculation system for the control of slime growths or corrosion.

QUEENSWAY EAST PLANT

DETAILS OF SURVEY

Messrs. P. Chisholm and P. A. Fischer toured this plant on April 30, 1971 and Mr. Fischer sampled here May 7, 1971.

Personnel Interviewed

Mr. Ourie Scott

Description of Plant and Process

This plant is a controlled atmosphere cold storage plant for apples. Atmospheric control consists of keeping the carbon dioxide concentration in the storage vaults low; the carbon dioxide being removed using a strong sodium hydroxide solution.

There is no retail outlet here, however some of the apples are washed prior to shipment. The apples are washed in water containing a small amount of soap, rinsed then bagged.

Operating Data

Number of employees	-	40
Operating schedule	-	8 hr/day
		5 days/week

Water Supply

Source - Simcoe PUC

Volume - 26,433 gpd - maximum 83,300 gpd (Aug.70)
(Average for May 70 to May 71)

Sources of Liquid Wastes and Disposal

The caustic solutions used for atmospheric control are emptied to a field tile system.

Apple wash and rinse water is emptied two or three times a week. The combined wash and rinse volume being approximately 300 gal. This water along with sanitary wastes and the overflow from the compressor cooling water system is discharged to the municipal sanitary sewer on the Queensway.

Sampling and Analysis

Grab samples were taken of the apple washer water, the contents of the sump in the South West corner of plant 3 and the cooling water overflow from plant 3.

The results are as follows:

Sample No.	BOD_5	Anionic Detergent	Solids		
			Total	Susp.	Dissolved
1	11	1.2	480	60	420
2	36	1.1	540	60	480
3	0.6	-	500	5	495

1. Apple washer water
2. Contents of sump in South West corner of Plant 3
3. Cooling water overflow Plant 3

DISCUSSION OF FINDINGS

Although there is a small continuous flow of water from the sump in Plant No.3, the only large flows (300 gal. max.) occur when the apple wash and rinse tanks are dumped together. In the course of one week a total of 900 gal. of these combined waters are likely discharged.

CONCLUSIONS AND RECOMMENDATIONS

Considering the nature and volume of the wash wastes they are acceptable for discharge to the sanitary sewer system.

Although no accurate estimate of the amount of cooling water going to the sanitary sewer was available it is suggested that this water be segregated and discharged to the storm sewer, or natural watercourse.

A word of caution should be given concerning the field tile disposal of the spent sodium hydroxide solutions. After use the solution discharged will contain sodium carbonate and sodium hydroxide which will, over a period of time cause the soil to become sodium-saturated, reducing soil permeability and increasing the pH of the soil solution. Not only is this undesirable from a soil quality view point, but also the ground water will eventually be affected and the water quality in neighbouring wells could be impaired. Therefore, consideration should be given to finding a more satisfactory method of disposing of spent solutions.

NORFOLK GENERAL HOSPITAL

This hospital is located on West Street and serves the Norfolk County area.

DETAILS OF SURVEY

Mr. P. A. Fischer visited the hospital on May 5, 1971 and sampled there on May 11, 1971.

Personnel Interviewed

Mr. H. J. Fair - Assistant Administrator
Mr. C. Wright - Chief Engineer
Mr. D. Walsh

Description of Institution

All the activities generally associated with a hospital are carried on here. The hospital employs an average of 400 people and has a treatment capacity of 215 beds, 200 of which are filled on an average. The hospital usually has 15 student nurses living in.

Operating Data

Number of employees - 400
Operating schedule - 24 hr/day
7 days/week

Water Supply and Distribution

Source - Simcoe PUC
Volume - 55,200 gpd

Distribution

Boiler make-up	-	2,400
Laundry	-	12,000
Sanitary (Patients, employees, students)	-	25,200
Compressor and cooling water	-	10,200
Miscellaneous	-	5,400
		55,200

Sources of Liquid Wastes and Disposal

The largest volume of waste is sanitary waste generated by the patients and staff. The laundry wash and rinse waters are also a significant source of waste.

Other sources are the kitchen operations the student nurses who live in, the employees and general washings and cleaning waters. All of these wastes are discharged to the municipal sanitary sewer at the junction of Head Street and Elgin Avenue.

Discharges to the storm sewer consist of continuous boiler blowdown, overflow from the seasonally operated cooling tower, and uncontaminated compressor cooling water.

All bandages, tissue and wastes from medical activities are incinerated in a pathogenic incinerator.

Sampling and Analysis

Mr. P. A. Fischer took the following samples on May 11, 1971 and forwarded them to the OWRC laboratory for analyses:

1. Total storm effluent taken at manhole in parking lot
   Composite: 1115 to 1715 hr. (half hourly)
2. Total sanitary effluent taken at manhole in parking lot
   Composite: 1185 to 1715 hr. (half hourly)

The analytical results are as follows:

Sample No.	BOD_5	Solids			Anionic Detergent	Total Phosphorus as P
		Total	Susp.	Diss.		
1	2.0	400	5	395	0.1	.022
2	200.	560	80	480	2.5	5.9

CONCLUSIONS

The sanitary wastes discharged by the hospital are within the sewer-use by-law limits and should create no problem for Water Pollution Control Plant.

The wastewater flow to the storm sewer is suitable for continued discharge.

The precautions taken to prevent further spillage of oil in the boiler room and storage tank areas are considered adequate.

S. F. TUBING COMPANY LIMITED

Located on Victoria Street this Company produces specially bent industrial tubings.

DETAILS OF SURVEY

The plant was visited on May 4, 1971 by Mr. P. A. Fischer and sampled by him on May 6, 1971.

Personnel Interviewed

Mr. K. Troullier - Manager

Description of Plant and Process

Lengths of tubing are received at the plant and cut and bent to the required lengths and shapes. Ends are affixed and the tubes are then cleaned and phosphated stepwise in the following baths prior to shipment:

1) Alkali cleaner bath
2) Running water rinse bath
3) Phosphoric acid bath with wetting agent
4) Running water rinse
5) Phosphating solution bath
6) Running water rinse
7) Sealer bath

Operating Data

Number of employees - 23
Operating schedule - 9 hr/day
5 days/week

Water Supply

Source - Simcoe PUC
Volume - 12,600 gpd

Sources of Liquid Wastes and Disposal

The only continuous source of liquid waste is the overflow waste from the phosphating line which consists of rinse waters. These wastes together with sanitary wastes flow to the municipal sanitary sewer.

Every six to eight months it is necessary to renew the alkali cleaner and the phosphoric acid baths at which time the two baths are dumped simultaneously to produce a neutral solution for discharge.

The other baths are not dumped.

Sampling and Analysis

A grab sample of the total discharge from the cleaning-phosphating line was taken from the overflow collection trough where it enters the floor drain. The analytical results as determined by the OWRC laboratory, Toronto are as follows:

Sample No.	BOD_5	Solids			Anionic Detergent ABS	pH at Lab.	Alkalinity as $CaCO_3$	Total Phosphorus as P
		Total	Susp.	Diss.				
1	*	560	30	530	0.2	6.3	74	90

*Interference inhibits analysis

1. Total discharge from phosphating line
Grab: 1040 hr - May 6, 1971.

DISCUSSION OF FINDINGS

Although the flow from the phosphating line is continuous when the line is operating, its operation is intermittent and at present, averages two days a week.

Nevertheless when operating the phosphorus loading will be

approximately 16 lbs/day or 10% of that at the Water Pollution Control Plant.

The periodic batch discharges of alkali and acid do constitute a high waste loading, however, judging from past practice the simultaneous dumping appears to minimize the effect of shock loading at the WPCP and the plant has experienced no problems from these wastes.

CONCLUSIONS

There is little the Company can do to substantially reduce the phosphorus content of its wastes. The phosphorus will be removed by the phosphate removal facilities to be incorporated in the expanded Water Pollution Control Plant.

Considering the analytical results and bearing in mind the intermittent operation of the phosphating line the discharge from normal operations is acceptable for disposal into the municipal sanitary sewer.

The WPCP should continue to be notified when batch dumpings are necessary, and should problems occur, the acid and alkali could be mixed and neutralized before discharge to the sewer.

SIMCOE LEAF TOBACCO CO. LIMITED

Located on First Avenue this Company processes tobacco leaves.

DETAILS OF SURVEY

Mr. P. A. Fischer visited this plant May 4, 1971.

Personnel Interviewed

Mr. Ulch - President

Description of Plant and Process

The plant operates from November to April and receives tobacco from growers after curing.

The leaves are dried sorted and stored prior to shipment and sale.

Operating Data

Number of employees	-	370
Operating schedule	-	8 hr/day
		5 days/week

Water Supply and Distribution

Source	-	Simcoe PUC
Volume	-	Nov. to April - 11,250 gpd
		May to Oct. - 800 gpd

Distribution

Sanitary	-	7,400 gpd
Boiler make-up	-	3,850 gpd
Total		11,250 gpd

Sources of Liquid Waste and Disposal

Sanitary wastes are all discharged to the municipal sanitary sewer on First Avenue, the boiler blowdown is discharged to a pond on the Company property. There is no compressor cooling water as all compressors are air cooled.

Sampling and Analysis

No sampling was carried out at this plant.

WASTE LOADINGS

Only sanitary wastes are discharged to the municipal sanitary sewer.

CONCLUSIONS AND RECOMMENDATIONS

There are no process wastes from this plant and the sanitary wastes are acceptable for disposal to the municipal sanitary sewer.

ST. WILLIAMS FROZEN FRUITS

This food processing plant is situated at 8 Second Avenue and backs onto Mill Pond.

DETAILS OF SURVEY

Messrs. P. Chisholm and P. A. Fischer visited the plant on April 29, 1971.

Personnel Interviewed

Mr. J. B. Jackson - President

Description of Plant and Process

The main operation at the plant is the year round production of frozen pies. Dough is mixed and formed into pie shells which are then filled with fruit filling and frozen prior to shipment. The fruit filling is made from previously processed fruit.

From October until April fresh and stored apples are processed. In brief the apples are washed, peeled, cored, sliced, blanched, canned and lastly frozen for sale or use as pie filling. The cores and peelings are pressed to extract the juice which is concentrated by evaporation, the final concentrate being sold.

Cherries are processed for two or three weeks in July. After being washed, pitted, canned and frozen they are sold or used as pie filling.

In addition to the above, small quantities of plums are also processed.

Operating Data and Water Consumption

	Pie Making	Apple Processing	Cherry Processing
No. of employees	28	73	88
Operating schedule	8 hr/day 5 days/week May to Sept.	8 hr/day 5 days/week Oct. to April	8 or 6 hr/day 5 days/week 2-3 weeks in July
Water Consumption	17,100 gpd	44,300 gpd	

Water Supply

Source - Simcoe PUC

It was not possible to accurately determine inplant distribution however, considering the flow May 70 to Sept.70 when, apart from short cherry processing period, only frozen pies were produced it is reasonable to assume that approximately 15,000 gpd of the 17,100 gpd flow was used for compressor and refrigeration cooling.

Sources of Liquid Waste and Disposal

The main continuous source of wastewater is that from compressor and refrigeration equipment cooling and is discharged to Mill Pond. There is also a year round source of wash and clean-up waters from the frozen pie operation.

During apple processing there is cooling water from an entrainment condenser, apple wash water and batch discharges of apple blanching water all of which together with sanitary wastes, go to the municipal sanitary sewer on Second Avenue.

Wastewater from cherry processing is screened to remove pits and discharged to the municipal sanitary sewer.

Sampling Analysis and Waste Loading

During this survey, only the minimal waste producing operation of producing frozen pies were being carried out. The waste loading was estimated at only 2,000 gallons per day of wash water, and this was not considered to be of significant concern to warrant sampling.

CONCLUSIONS AND RECOMMENDATIONS

At the time of the survey only frozen pies were being produced, and therefore the only process wastewater should be that from washing and clean-up operations associated with pie production. This wastewater, providing it does not contain lumps of dough or excessive grease which may clog or contribute to obstructions in sewers, is acceptable for discharge to the municipal sanitary sewerage system. With proper maintenance the existing grease trap and suitable screens should produce an effluent that meets the requirements of the Town of Simcoe sewer-use by-law for discharge to a sanitary sewer.

Previous experience has shown that strong wastes result from apple and cherry processing operations, and in order to assess the waste loadings during these operations it will be necessary to re-visit the plant.

ST. WILLIAMS PRESERVES LIMITED

This plant which manufactures jams and preserves is located on Gilbertson Drive.

DETAILS OF SURVEY

Messrs. P. Chisholm and P. A. Fischer visited this plant on April 29, 1971, and Mr. Fischer sampled here on May 12, 1971.

Personnel Interviewed

Mr. B. G. Hoye - Manager

Description of Plant and Process

Jams, jellies, marmalades, and pie fillings are made from previously preserved fruit stocks. Depending upon what is being made fruit stocks may be blended, and colour, pectin, and syrup added.

The mixture is cooked in small batch kettles which are emptied onto a cooling table.

After a cooling period, the mixture is pumped to a bottling or canning line.

The bottles or cans are sealed and then enter a cooling and washing unit from which they emerge to be labelled and packed for shipment and storage.

Operating Data

Number of employees	-	120
Operating schedule	-	1 shift/day
		5 days/week

Water Supply and Distribution

Source	-	Simcoe PUC	
Volume	-	34,600 gpd (Sept. 70 to Jan. 71 average)	
Distribution	-	Boiler make-up	- 3,000 gpd
		Sanitary wastes	- 2,400 gpd
		Washing and cooling water	- 29,200 gpd
			34,600 gpd

The average daily flow for the period Sept. 70 to Jan. 71 was as stated above, 34,600 gpd, however the minimum average daily flow (Oct.70) was 22,500 gpd and the maximum (Jan.71) was 48,500 gpd.

Sources of Liquid Wastes and Disposal

The largest volume of wastewater comes from the continuous overflow of the jar cooling and washing unit, frequent floor washing also contribute substantially. These wastes and all sanitary wastes are discharged to the municipal sanitary sewer.

Sampling and Analysis

The following samples were taken by P. A. Fischer on May 12, 1971 and forwarded to the OWRC laboratory for analysis:

1. Plant effluent at manhole outside lunchroom -
   Composite: 0945 hr. to 1500 hr. (half hourly)
2. Jar cooling and washing water overflow to sewer -
   Grab: 1315 hr.
3. Plant effluent at manhole outside lunchroom -
   Composite: 1500 hr. to 1545 (every 5 min.)

The analytical results appear below:

Sample No.	BOD_5	Solids			Colour Dilution	Detergent ABS	Phosphorus as P
		Total	Susp.	Diss.			
1	900	1,340	80	1,260	*1:2	0.1	2.6
2	90	420	10	410	-	-	-
3	3800	3,760	80	3,680	*1:25	0.1	0.90

*filtered

All analyses except Colour Dilution in parts per million:

WASTE LOADINGS

	Volume gpd	BOD lb/day	Susp. Solids lbs/day
Plant effluent (before addition of sanitary wastes)	29,200	252	23.2
Sanitary			

DISCUSSION OF RESULTS

The analytical results show a high BOD, (almost certainly due to sugar in the wastewater) in excess of the Town sewer-use by-law. There is no simple method of treating these wastes to reduce the high BOD loading prior to discharge to the sanitary sewer. The normal method of treating this type of waste is by biological treatment and the economics of this would favour discharge of the untreated wastes to the sanitary sewer even with the application of a surcharge.

CONCLUSIONS AND RECOMMENDATIONS

It may well be possible to reduce the waste loading by washing as little jam as possible into the waste stream. With this in mind the

Company would do well to have a close look at its inplant housekeeping remembering that a reduced waste loading may well save them money in the future.

The wastes from this plant although of a high BOD (equivalent to a population of 1380) should not prove unacceptable to the Municipal Water Pollution Control Plant.

Prepared by:

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Approved by:

R. C. Stewart

R. C. Stewart, P. Eng.,
Regional Engineer,
Division of Industrial Wastes.

PAF/vs